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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,000	04/26/2001	Toru Otsubo	503.39737X00	7052

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EXAMINER	
CROWELL, ANNA M	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 12/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/842,000	OTSUBO, TORU
	Examiner	Art Unit
	Michelle Crowell	1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The substitute specification has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsubo et al. (Japanese Patent Publication 11-260596) in view of Gesche et al. (U.S. 5,140,223) and Tobe et al. (U.S. 5,891,349).

Referring to Drawing 1 and 16, and paragraphs [0113]-[0130], Otsubo et al. discloses a plasma processing apparatus comprising a plasma processing gas supply means, an exhaust air means [0114], plasma generating means and capacitively coupled discharge means consisting of mutually isolated conductors (counterelectrodes 71a 71b 71c) [0115], a magnetic field forming means (a coil 58) [0131], and electromagnetic wave radiating means (counterelectrodes with RF generators 81 and 82), a capacitor 83, and a stage electrode 52. Insulating materials 80a 80b 80c mutually insulates each of the counterelectrodes 71a 71b 71c, thereby creating mutually isolated multiple conductors [0115].

Additionally, a high-frequency voltage 81 and 82, whose phase can be shifted by a capacitor 83, is supplied to the counterelectrodes 71, thereby generating electromagnetic waves. The power of electromagnetic waves radiates through the insulators and counterelectrodes. A resonant circuit is formed via the insulators 80 and the capacitor 83. The signal generator 97 controls the phase of the high-frequency signal [0130]. Alternately, the electromagnetic waves can be generated by antenna 11 [0041].

Specifically, the distribution of the plasma density can be controlled by controlling the radiated electromagnetic waves based on the adjustment of the phase of the high-frequency voltage supplied to the counterelectrodes 71. Moreover, the distribution of the plasma density due to capacitive coupled plasma can be controlled by controlling the outputs of the high frequency power supplies 81 and 82 [0131].

Regarding claims 7 and 8, a means to send RF current (bias power supply 56) to a substrate 55 [0122].

Regarding claim 8, multiple RF current conducting means (counterelectrodes 71a 71b 71c) are installed at a position opposite to a position where the substrate 55 to be processed is mounted. The multiple RF current conducting means are provided with a means (filters) to control a ratio of RF current flowing from the substrate to be processed to each of the RF current conducting means. Moreover, each counterelectrodes 71a 71b 71c is grounded through low pass filters (not shown), and a high-frequency current from a bias power supply 56 is allowed to flow through each of the counterelectrodes 71a 71b 71c [0116]. Thus, the filter controls the ratio of RF current flowing from the substrate to each of the counterelectrodes 71a 71b 71c.

Otsubo et al. fails to teach a radio frequency displacement control means forming a LC circuit.

Referring to Drawings 1 and 2, Gesche et al. teaches a plasma processing apparatus wherein an electromagnetic wave radiating means 1 includes a radio frequency displacement control means forming a LC circuit 9, 10 in order to satisfy adjustment conditions necessary with high frequency power. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Otsubo et al. with the radio frequency displacement control means forming a LC circuit as taught by Gesche et al. since adjustment conditions necessary with high frequency power are satisfied.

Otsubo et al. fails to specifically teach an electromagnetic wave power control means

Referring to Figures 1 and 8, column 10, lines 6-57, and column 14, lines 17-30, Tobe et al. teaches a plasma processing apparatus comprising an electromagnetic wave radiating means (electrode 61) which includes a radiated electromagnetic wave power control means (variable capacitor controller 105) to control the radiated electromagnetic waver power through the variable capacitor 81a. Variable capacitors are used to control the electrode's potential. The controller is used to more precisely control the inputs/outputs of the variable capacitors. Thus, it would have been obvious to one of ordinary skill in the art to control variable capacitor of the radio frequency displacement control means of Otsubo et al. in view of Gesche et al. with the electromagnetic wave power control means as taught by Tobe et al. This would precisely control the potential of the electromagnetic wave radiating means, and thus control the plasma distribution.

Otsubo et al. fails to teach a means to store and a means to control plasma distribution.

Regarding claim 3, column 10, lines 45-57, Tobe et al. discloses a plasma processing apparatus having a variable capacitor controller which includes a CPU. The CPU is capable of storing a processing procedure to control distribution during plasma processing, and thus control plasma distribution according to the processing procedure stored. Therefore, it would have been obvious to one of ordinary skill in the art to provide electromagnetic wave radiating means of Otsubo with the means to store and means to control plasma distribution as taught by Tobe. This would precisely control the potential of the electromagnetic wave radiating means, and thus control the plasma distribution.

Response to Arguments

4. Applicant's arguments with respect to Otsubo et al. and the LC circuit have been considered but are moot in view of the new ground(s) of rejection.

Applicants have argued that Tobe et al. fails to store a processing procedure and a means to control plasma distribution. However, Tobe et al. teaches a CPU which is capable of storing a processing procedure to control distribution during plasma processing. Additionally, since the variable capacitor controller of Tobe et al. controls the variable capacitor, varying the capacity of the variable capacitor controls the plasma distribution. A specific processing procedure has not been claimed, thus Otsubo et al. in view of Gesche et al and Tobe et al. satisfy the claimed requirement.

Applicants have argued that the bias power supply of the present invention becomes an output separated from the ground through the intermediary of the transformer and a flow path of

the RF current flowing from this stage electrode to the process chamber returning to the bias power supply through ground is eliminated. Such structural limitation of a transformer has not been claimed. Thus, since the RF bias circuit 56 in Otsubo et al. is directly connected to the stage electrode 52, the claim requirement is satisfied.

Applicants have argued that Otsubo et al. does not disclose the provision of low-pass filters connected so that RF current applied to the stage electrode 52 thereof from the bias power supply 56 can flow through the opposite electrode 71. However, paragraph [0116] of Otsubo et al. discloses that low pass filters are provided so that current from the bias power supply 56 flows through the counterelectrode 71.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC amc
November 24, 2003

GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700